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(54) Title: A METHOD AND SYSTEM FOR CLOUD BASED FUNCTIONAL AND LOAD TESTING

(57) Abstract: The invention relates to a method and system for simulating upstream data and downstream data associated with the cloud based application and testing the cloud based application in response to varying loads of the upstream data and downstream data. The simulating upstream data includes simulating a plurality of hardware devices and simulating downstream data includes simulating a plurality of users associated with the cloud based application.

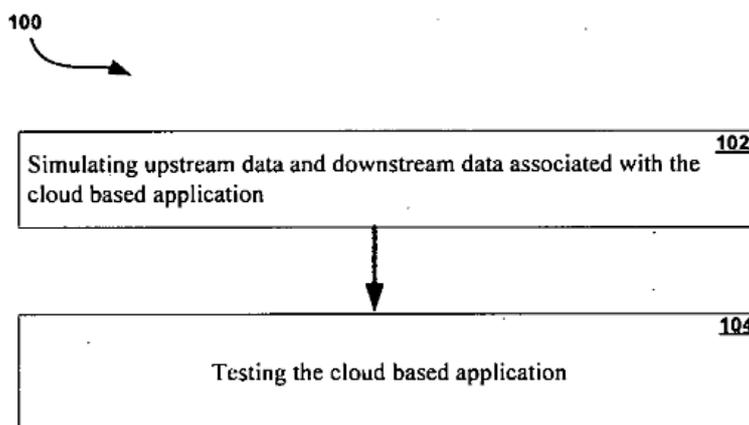


Figure 1

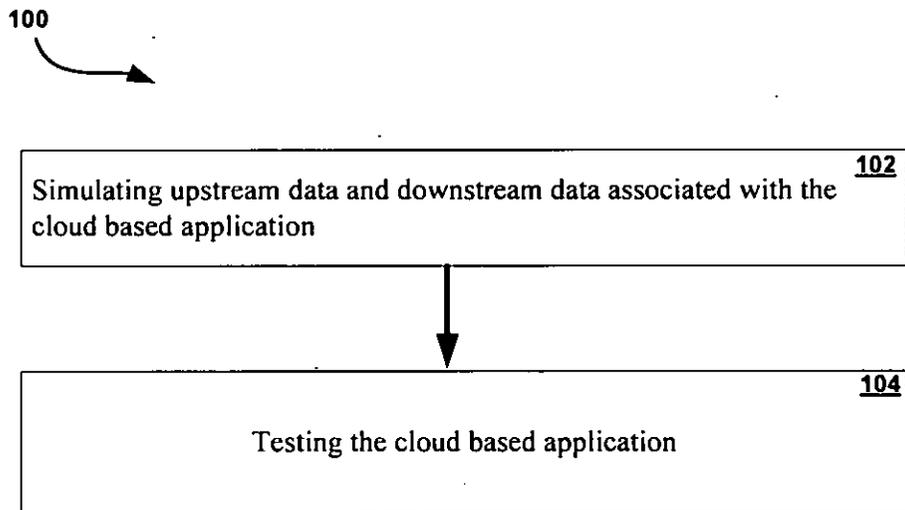


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ABSTRACT

A METHOD AND SYSTEM FOR CLOUD BASED FUNCTIONAL AND LOAD TESTING

The invention relates to a method and system for simulating upstream data and downstream data associated with the cloud based application and testing the cloud based application in response to varying loads of the upstream data and downstream data. The simulating upstream data includes simulating a plurality of hardware devices and simulating downstream data includes simulating a plurality of users associated with the cloud based application.



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We Claim:

1. A method for testing a cloud based application, comprising:

simulating upstream data and downstream data associated with the cloud based application, wherein simulating upstream data includes simulating a plurality of hardware devices and simulating downstream data includes simulating a plurality of users associated with the cloud based application; and

testing the cloud based application in response to varying loads of the upstream data and downstream data.

2. The method as claimed in claim 1, wherein the plurality of hardware devices correspond to a real world object, equipment or machinery.

3. The method as claimed in claim 1, wherein the simulating a plurality of hardware devices includes creating a virtual environment of real devices and virtual devices.

4. The method as claimed in claim 1, wherein the hardware device is a HVAC, thermostat, TV, refrigerator, elevator or washing machine.

5. The method as claimed in claim 1, further comprises generating a test report.

6. The method as claimed in claim 1, further comprises, simulating errors in the upstream data or downstream data to perform functional testing of the cloud based application under error conditions.

7. The method as claimed in claim 1, further comprises, simulating errors in the upstream data and downstream data to perform functional testing of the cloud based application under error conditions.

8. The method as claimed in claim 1, further comprises, determining a breakpoint load for the cloud based application.

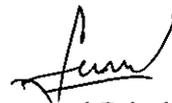
9. A system for testing a cloud based application, the system comprising:

a load generator module configured to simulate upstream data and downstream data associated with the cloud based application, wherein simulating upstream data includes simulating a plurality of hardware devices and simulating downstream data includes simulating a plurality of users associated with the cloud based application; and

an analysis module configured to analyse the response of the cloud based application to varying loads of the upstream data and downstream data.

10. The system as claimed in claim 9, further comprises, determining a breakpoint load for the cloud based application.

Dated this 30th day of March 2016



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FIELD OF INVENTION

The invention generally relates to system and methods for testing cloud applications and more particularly to functional and load testing of the cloud applications.

BACKGROUND

Existing technologies test a cloud based application when it is subjected to a load. They provide load testing for the cloud based application where only analysis of data in the cloud may be done irrespective of where the data is being generated or acquired from. However, there is a need to perform load testing of the cloud based application by simulating devices and users communicating with the cloud based application. This is necessary to identify behaviour of the cloud based application to varying loads thereby providing a lot of scope for failure identification and further improvement.

The present invention is directed to overcome one or more of the problems as set forth above.

SUMMARY OF THE INVENTION

Exemplary embodiments of the invention disclose a method and system for simulating upstream data and downstream data associated with the cloud based application and testing the cloud based application in response to varying loads of the upstream data and downstream data. The simulating upstream data includes simulating a plurality of hardware devices and simulating downstream data includes simulating a plurality of users associated with the cloud based application.

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BRIEF DESCRIPTION OF DRAWINGS

Other objects, features, and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

Figure 1 illustrates a block diagram of a process for load testing a cloud based application, according to one embodiment of the invention; and

Figure 2 illustrates an exemplary system for load and functional testing of cloud based application, according to one embodiment of the invention.

DETAILED DESCRIPTION OF DRAWINGS

The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of exemplary embodiments of the invention as defined by the claims and their equivalents. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the invention. In addition, descriptions of well-known functions and constructions are omitted for clarity and conciseness.

According to embodiments of the invention, a system and method for performing load testing and functional testing of a cloud based application is disclosed.

FIG. 1 illustrates a block diagram of the process 100 for testing a cloud based application according to an embodiment of the invention. At step 102, simulation of upstream data and downstream data associated with the cloud based application is performed. According to an embodiment, the cloud based application may be an IoT application. The simulation of upstream data may include simulating a plurality of hardware devices and the simulation of downstream data may include simulating a plurality of users associated with the cloud based application.

According to an embodiment, the simulation of a plurality of hardware devices may include creation of a virtual environment of real devices and virtual devices. According to an embodiment, the plurality of hardware devices associated with the cloud application may include hardware devices such as, but not limited to HVAC, thermostat, TV, refrigerator, elevator and washing machine, communicating with the cloud based application. According to another embodiment, functionality of the hardware devices such as sensor signals may be simulated. According to yet another embodiment, the hardware devices may correspond to a real world object, equipment or machinery.

According to an embodiment, the simulation of users associated with the cloud based application may include simulation of users such as, but not limited to registered mobile users, tablet users etc. communicating with the cloud based application.

At step 104, the cloud application is tested in response to varying loads of the upstream data and the downstream data. According to an embodiment of the invention, various patterns of

loads may be configured by a user. According to an exemplary embodiment, the load patterns may be such as, but not limited to, spike load, periodic load, parabolic load and instant load.

FIG. 2 illustrates an exemplary system 200 for testing cloud based applications, according to one embodiment of the present invention.

The disclosed system 200 may include a load generator module 202, an error simulator module 204, a cloud module 206 and an analysis module 208.

The load generator module 202 may generate load for a test application running in the cloud module 206. The load generator module 202 may enable load testing of the test application. According to an embodiment, the generated load may be sent to the test application through a communication network. The communication network may be a wired or wireless communication network.

The load generator module 202 may simulate upstream data and downstream data associated with the test application. The simulating upstream data may include simulating a plurality of hardware devices and simulating downstream data may include simulating a plurality of users associated with the test application. According to an embodiment, simulating a plurality of hardware devices includes creating a virtual environment of real devices and virtual devices. According to another embodiment, hundreds to thousands of upstream devices and downstream users may be simulated to test the application. The number of upstream devices and downstream users may be scaled as per requirements of testing. According to an embodiment, the load generator module 202 may be associated with a data collection engine. According to an embodiment, the data collection engine may collect the data from the simulated devices and

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send the collected data to the cloud module 206 through protocols such as TCP/IP. According to another embodiment, the communication between the simulated devices and the cloud module 206 may be through protocol such as, but not limited to, TCP/IP. According to yet another embodiment, the communication between the simulated users and the cloud module 206 may be through protocol such as, but not limited to, MQTT, REST, CAN and UDP.

According to another embodiment, the load generator module 202 may simulate hardware devices as well as parameters associated with the hardware devices. According to yet another embodiment of the invention, the load generator module 202 may create multiple instances of the hardware devices. The multiple instances of hardware devices may mimic a scenario where multiple devices generate a large amount of data.

According to an embodiment, the load generator module 202 may be capable of simulating devices and simultaneously data exchange with the cloud irrespective of the number of devices or the frequency of data exchange.

According to an embodiment, the simulated upstream data associated with the hardware devices may be sent to a storage module for storage, analysis and other processing.

According to a further embodiment of the invention, the load generator module 202 may generate various patterns of loads and provide to the cloud based application. According to another embodiment, the various load patterns may be configured by a user. According to an exemplary embodiment, the load patterns may be such as, but not limited to, spike load, periodic load, parabolic load and instant load.

The error simulator module 204 may simulate errors in the upstream data, downstream data or in both upstream and downstream data and send the simulated errors to the test application running in the cloud module 206. According to an embodiment, the simulated errors may be sent through a communication network. The communication network may be a wired or wireless communication network. According to another embodiment, the error simulator module 204 may enable functional testing of the test application under error conditions. According to yet another embodiment, the errors may be simulated in real-time.

The test application running in cloud module 206 may receive inputs from the load generator module 202 and the error simulator module 204. The cloud module 206 may output the test results to the analysis module 208. The analysis module 208 may be configured to analyse the response of the cloud based application to varying loads of the upstream data and downstream data.

The analysis module 208 may receive test results from the cloud module 206 to perform analysis on the test results. According to an embodiment, the test results may be received through the communication network. The analysis module 208 may perform analysis on the test results and generate a test report.

According to an embodiment, the analysis module 208 may include a processor to perform analysis on the test results. According to another embodiment, the analysis module 208 may display the test report on a display device such as but not limited to Cathode ray tube display (CRT), Light-emitting diode display (LED), Electroluminescent display (ELD), Plasma display panel (PDP) etc. According to one embodiment, the display may include a graphical user

interface (GUI). According to another embodiment, a display device may be coupled to the cloud module 206.

According to an embodiment of the invention, the system 200 may generate a test report on load testing of the cloud based application. According to another embodiment of the invention, the system 200 may generate a report on functional testing of the cloud based application. According to yet another embodiment of the invention, the system 200 may determine a breakpoint load for the cloud based application. According to a further embodiment, the system 200 may calculate a round trip time for communication between devices and users using cloud.

It is understood that the above description is intended to be illustrative, and not restrictive. It is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined in the appended claims. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein," respectively.

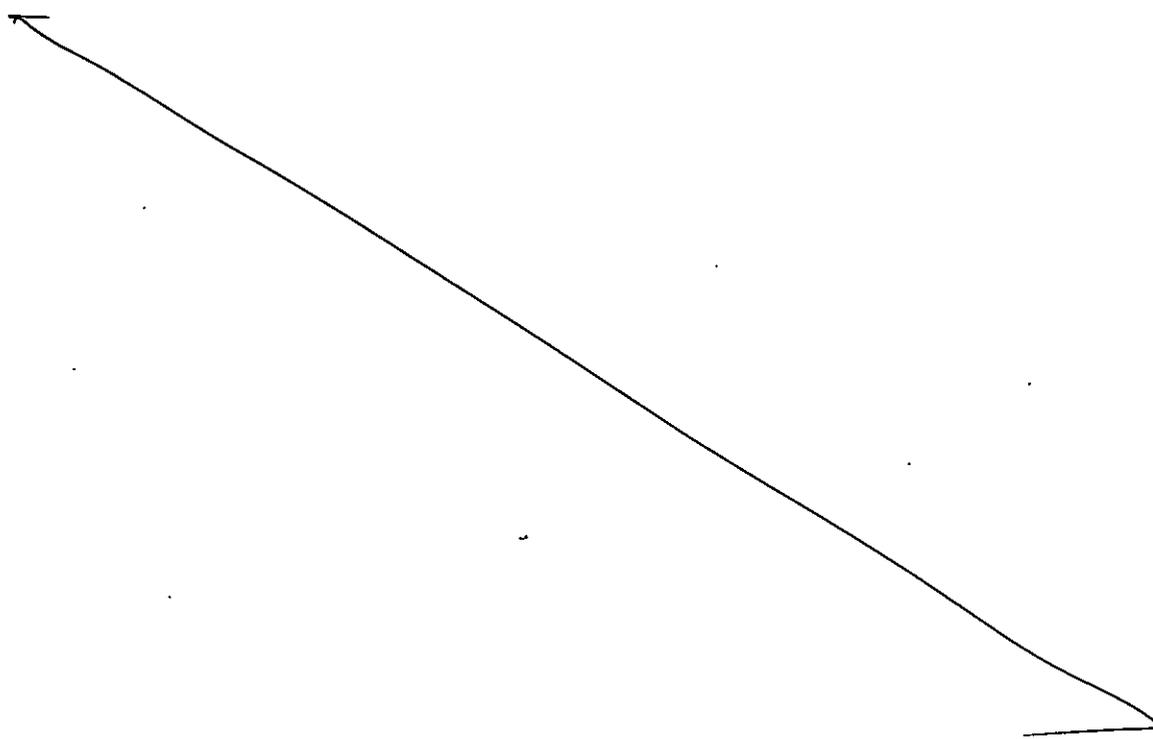
In the drawings and specification there has been set forth preferred embodiments of the invention, and although specific terms are employed, these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in the form and the proportion of parts, as well as in the substitution of equivalents, are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of the invention.

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Throughout the various contexts described in this disclosure, the embodiments of the invention further encompass computer apparatus, computing systems and machine-readable media configured to carry out the foregoing systems and methods. In addition to an embodiment consisting of specifically designed integrated circuits or other electronics, the present invention may be conveniently implemented using a conventional general purpose or a specialized digital computer or microprocessor programmed according to the teachings of the present disclosure, as will be apparent to those skilled in the computer art.

Appropriate software coding can readily be prepared by skilled programmers based on the teachings of the present disclosure, as will be apparent to those skilled in the software art. The invention may also be implemented by the preparation of application specific integrated circuits or by interconnecting an appropriate network of conventional component circuits, as will be readily apparent to those skilled in the art.





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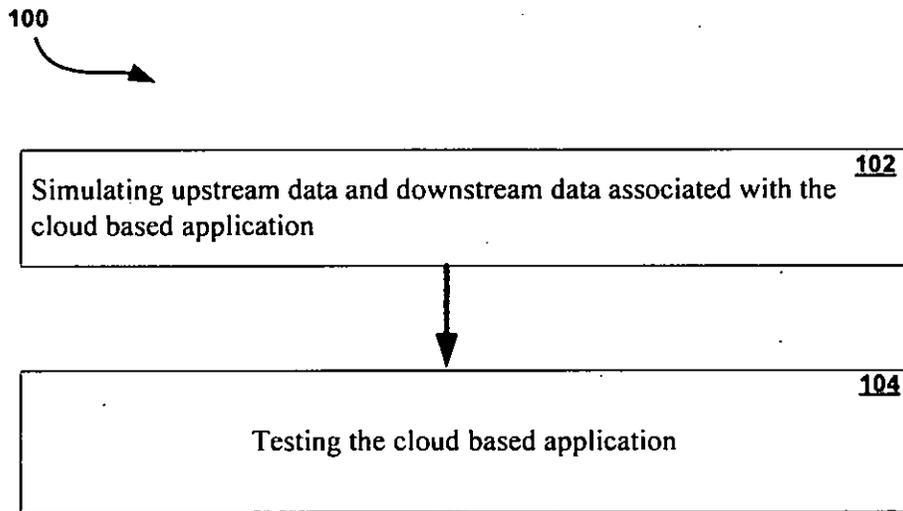
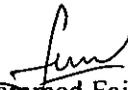


Figure 1


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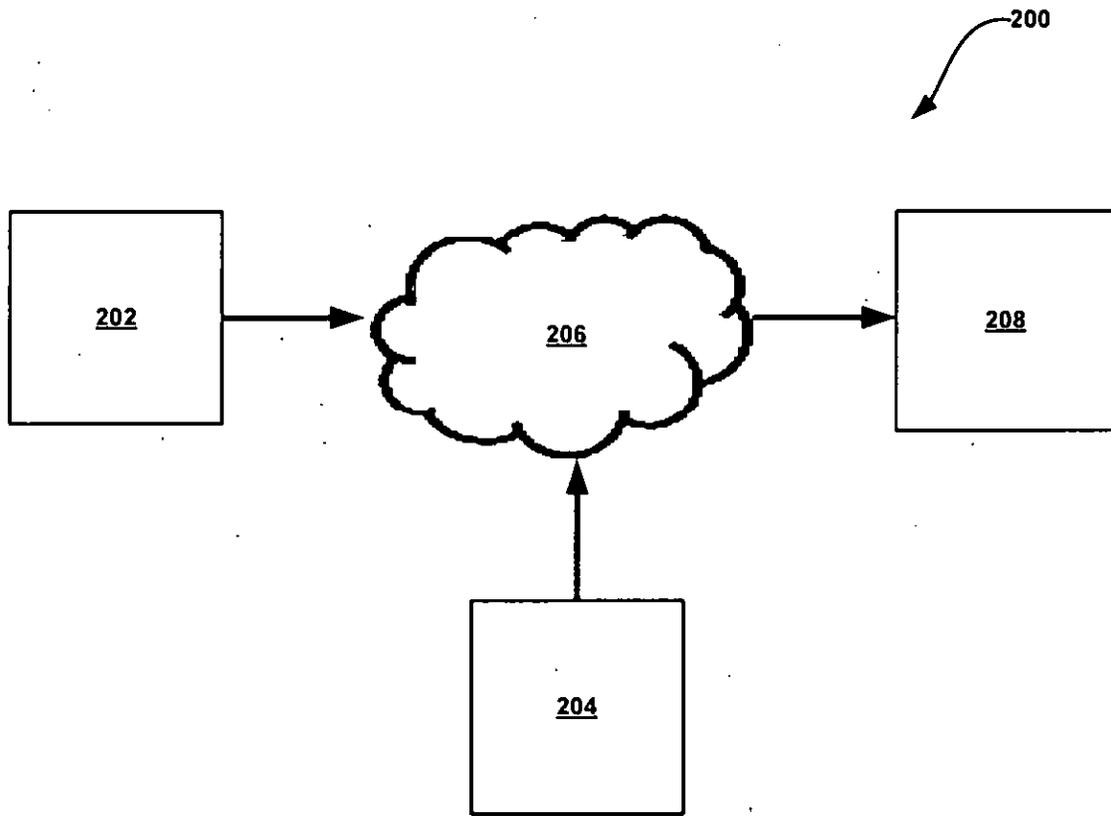
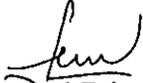


Figure 2


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